

The role of surface electrocardiogram after complex left atrial arrhythmias' ablation: behind electrical mechanisms

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We report of an interatrial dissociation after two relatively limited left atrial ablations for paroxysmal atrial fibrillation (PAF), with sinus rhythm in the right atrium and ongoing atrial tachycardia (AT) in the left atrium (LA). Patients suffering from PAF are supposed to have less electrical and anatomical remodelling; however, the role of low-voltage and scar areas with functional conduction block in these patients is still ongoing discussion.

A 64-year-old woman was referred to our centre for PAF on therapy with beta-blockers, occurring since 1 year. Echocardiography revealed a moderate dilatation of the LA with preserved left ventricular systolic function. She underwent successful pulmonary vein isolation (PVI) and no antiarrhythmic drugs were prescribed following the procedure. During a 3-month follow-up, the patient developed highly symptomatic episodes of persistent AF requiring a second ablation. The patient underwent a re-PVI and, thereafter, limited additional ablation of complex fractionated atrial electrograms (CFAEs) was performed in LA (roof and anterior wall, no additional linear lesions were created), including the coronary sinus (CS) region (ablation was commenced endocardially by dragging along the inferior perimitral left atrium and was continued epicardially from within the vessel). Atrial fibrillation converted into an organized AT. Entrainment and activation mapping revealed one localized re-entry at the cranial posterior LA and a second one anteriorly located, both related to a slow conduction zone within spontaneous low voltage area. After a total of 30 min of RF ablation, we observed an inter-atrial (left to right atrium) dissociation of atrial activation (*Figure 1A*): surface electrocardiogram (ECG) showed a conversion into sinus rhythm, whereas intracardiac electrograms revealed complete electric dissociation of the right atrium (RA) from the LA. Sinus rhythm in the RA was recorded at the proximal electrodes of CS catheter placed at CS ostium, while ongoing AT was recorded from the circular mapping catheter placed in the left atrial appendage and from the distal electrodes of the CS catheter placed along the inferior perimitral LA (*Figure 1B*). We performed an electrical cardioversion with the restoration of sinus rhythm in both atria. During a follow-up of 5 months, the patient had no clinical recurrence of supraventricular arrhythmias on Holter ECG monitoring, off antiarrhythmic medications. She was in good performance status and further

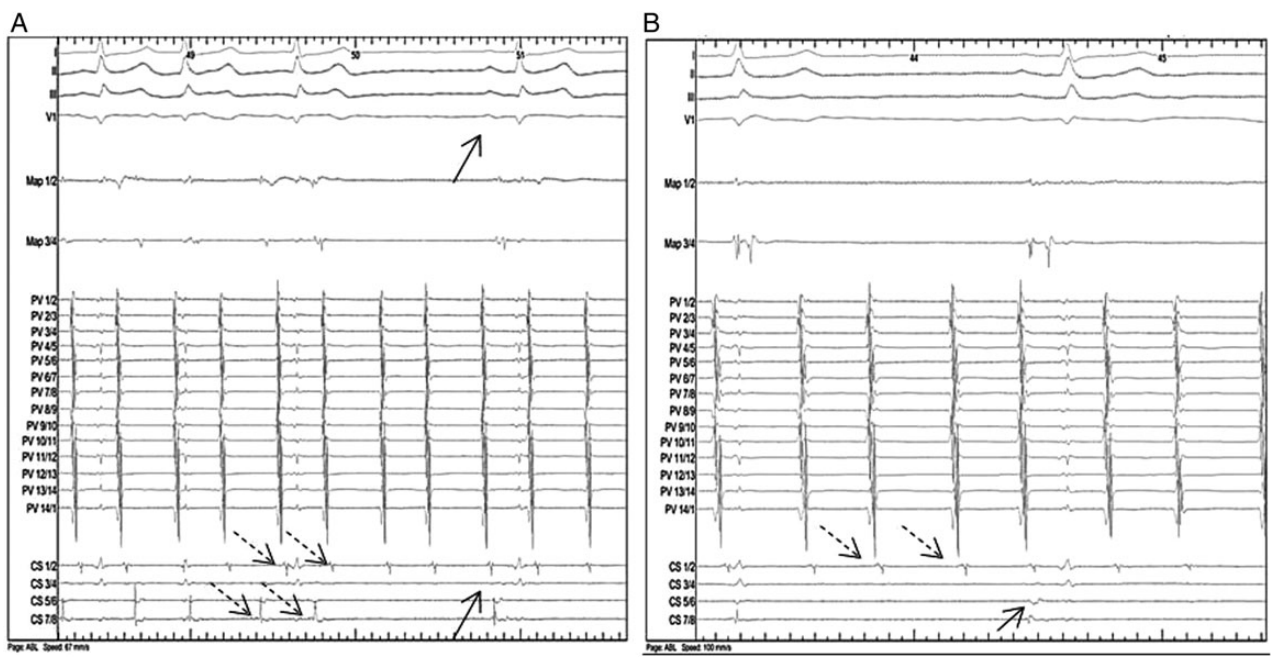


Figure 1 Surface ECG (leads I, II, III, and V1) and intracardiac recordings from the Orbiter catheter (PV 1/2–14/1) and the CS catheter placed in the left atrial appendage and in the coronary sinus respectively.

ablation procedures were not performed. However, transthoracic echocardiograms showed absence of diastolic A waves of left atrial contraction in the transmitral Doppler echocardiographic analysis at 5 months follow-up.

Inadvertent isolation between parts of the atria as well as complete left atrial dissociation has already been described.¹ However, in those case series interatrial connections were disrupted after extensive left-atrial and interatrial (including the left atrial aspect of the septum) ablation or after epicardial ablation procedures during surgery. In our patient, however, both ablation procedures focused on PVI and only in the second ablation procedure, a relatively limited ablation in CS and anterior LA was performed, but none septally. Propagation of electrical activity from the right to the left atrium and—in AF—vice versa is provided by two rapidly conducting tracks, the Bachman bundle cranially and the CS caudally as well as by the slower direct septal propagation.² It has to be assumed that atrial fibrosis, comprising large areas of septum, anterior wall, and infero-septal LA, had developed over months.³ Thus, it is possible that native scar areas have contributed to alter the conduction between the right and left atrium. After such inadvertent complete dissociation of the left atrium, one might question the role of surface ECG regularly performed during the long-term follow-up of outpatients. Actually, a recurrence of (only) left atrial arrhythmia would have been unrecognizable. Thus, we will have in this patient no possibility to assess her 'true' atrial rhythm.

Conflict of interest: none declared.

References

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